Financial Structures, Political Risk and Economic Growth

Junhong Yang[a], Pei Liu[b *], Yuchao Peng[c], Yukun Shi[d],

[a] *School of Finance & Management, SOAS University of London, London WC1H 0XG, UK*

[b] *Newcastle University Business School, Newcastle University, UK*

[c] *School of Finance, Central University of Finance and Economics, Beijing, China*

[d] *Adam Smith Business, University of Glasgow, UK*

Abstract

Using a panel of 113 countries over the period from 1990 to 2013, this paper provides new empirical evidence to the intensive debate of whether financial structure is relevant for economic growth. Specifically, we evaluate the role of political risk, development stage and their interactions with the structure of the financial system. We find that on average a more market-based financial system is associated with a higher level of economic growth. This impact varies with different levels of political risk and different stages of economic development. Specifically, the comparative development of equity markets compared with banks appear to promote more economic growth in countries with lower political risk and at a better stage of economic development. Moreover, banks are more important to economic growth in over-market-based financial systems, whilst equity markets are more sensitive to economic growth in over-bank-based financial systems. Our paper provides new insights into the real effects of the mixture of banks and markets on the economy.

Keywords: Financial structure; Political risk; Economic development

* Corresponding author.

1. Introduction

Research finds that both the operation of banks and the functioning of securities markets influence economic development (Gerschenkron, 1962; Allen and Gale, 2000; Levine, 2002). Nonetheless, there is hardly any consensus at the theoretical level. Despite the Schumpeter (1959) argument for financial structure theories: bank-based, market-based, legal-based, and the financial service-based theories, prior research generally overlook parameter heterogeneity and the non-linear relationship between finance and economic growth across countries, which may bias the estimates. Another challenge in the finance-growth nexus is that finance and growth are endogenously determined due to reverse causality, omitted variables, and potential measurement errors in empirical research. For example, economic growth could impact the development of bank credit and market capitalization, which rebalances a country's financial structure. In this research, we aim to fill these research gaps by providing cross-country evidence for the real effects of financial structure on economic growth from the perspective of country risk.

The bank-based theory emphasizes the importance of banks in economic growth and development. Specifically, proponents of this view argue that banks are better positioned than the markets in addressing agency problems and short-termism (Stiglitz, 1985; Bhide, 1993). They further argue that banks are better at identifying good projects and managing risk. For instance, the proponents of the bank-based view posit that since banks have the expertise required for loan appraisal, they can use this expertise to distinguish between good and bad borrowers, thereby reducing the cases of delinquent loans. Levine and Zervos (1996) use cross-country data to establish that banks are more effective in promoting economic growth for countries at the early stage of development. Moreover, Gerschenkron (1962), Diamond (1984), Boyd and Prescott (1986), Bencivenga and Smith (1991), Stulz (2000), to name but a few, also support this argument by their research and findings.

The market-based theorists enumerate the essentials of equity-market-based economy as it relates to growth. Levine (1997), Boyd and Smith (1998), Holmström and Tirole (1993), Jensen and Murphy (1990), Boot and Thakor (1997), among others, suggest that the market-based theory highlights the advantages of well-functioning equity markets in reducing the inherent inefficiency associated with banks and promoting successful economic performance. In addition, the proponents of the market-

based theory argue that well-developed markets enhance corporate governance, facilitate risks, and foster growth.

The third theory is the financial service theory, which views the bank-based and market-based debate as irrelevant. This theory relegated the bank-based versus market-based argument to the background while placing the analytical spot on the different roles of banks and markets in a country's financial system. According to Arestis et al. (2005), bank-based versus market-based arguments do not matter, however, "it is both banks and markets that matter." The financial service theorists argue that banks and markets do not compete, but exist to complement each other (Levine, 2002). Through the comparative analyses of the UK and US (the market-based systems), and Germany and Japan (the bank-based systems), Allen and Gale's (2000) theory of financial structure suggests that banks and markets provide different financial services. Economies at different stages of economic development require different mixtures of these financial services to operate effectively, thus require different mixtures of banks and markets. They also argue that if an economy's actual financial structure differs from the optimal structure, the economy will not obtain the appropriate blend of financial services, with deleterious effects on economic activity. Demirguc-Kunt et al. (2011) conclude that financial structure matters based on a variety of empirical tests. They find that, as economies develop, the services provided by financial markets become comparatively more important than those provided by banks. Moreover, deviations of a country's actual financial structure from the estimated optimal structure are associated with lower levels of economic activity.

The legal-based theory — espoused by La Porta et al. (1997, 1998, 1999a, 1999b) — attributes differences in creditor legal rights, contract enforcement efficiency, and legal system effectiveness in ensuring strict adherence to established laws to differences in financial structure across countries. This theory argues "finance as a set of contracts and these contracts are defined — and made more or less effective — by legal rights and enforcement mechanisms." Thus, it is the legal system that determines the quality of financial services.

Considering the heterogeneity and the non-linear relationship across countries, we re-assess the empirical connection between financial structure and economic growth. Specifically, we evaluate (i) the role of the political risk in shaping the link between financial structure and economic development and (ii) whether the impact of financial

structure on economic growth change during the evolving stage of economic development (iii) whether the impact differs between OECD and non-OECD countries and between over-market-based and over-bank-based countries. To execute this study, we use data on 113 countries over the period from 1990 through 2013, and we aggregate the data in 3-year averages (data permitting) so that we have a maximum of eight observations per country. Financial structure data are collected from GFDD (Global Financial Development Database), political risk indicators from ICRG (International Country Risk Guide), and other data from WDI (World Development Indicators) from World Bank. Based on a variety of empirical specifications (different economic growth models) and various econometric methodologies (GMM, instrumental variable (IV), fixed-effect estimations), we find a more market-based financial system is associated with higher levels of economic growth, and this impact is more pronounced for countries with lower political risks and higher levels of economic development and OECD countries. In addition, credit markets (bank credit) is more important to economic growth in over-market-based financial systems, whilst equity markets are more sensitive to economic growth in over-bank-based financial systems.

To overcome the endogeneity concerns and gain a clearer understanding of the finance-growth nexus, we first employ an instrumental variable approach using the dummies of Law Origin as the instrument variables for capital structure. Second, we employ the system-GMM, which treats all regressors as being potentially endogenous. Third, to control for potential measurement errors, we use the ratio of bank credit to value traded in equity markets and the ratio of bank assets to market capitalization as alternative measures of financial structure in estimations. Fourth, to mitigate concerns about omitted factors that may explain economic growth, we include additional control variables into our baseline models. We also control for country, year, and income-year fixed effects in all specifications.

We contribute to two streams of literature. First, our paper contributes to the literature on finance and growth. Many scholars have tried to understand the relationship between financial development and economic growth (Rajan and Zingales, 1995; Levine 1997; Rajan and Zingales, 1998; Beck and Levine, 2004). We use rich cross-country data to explore the evolving importance of financial markets and intermediaries during the process of economic development. We also take into account country-specific heterogeneity and investigates the linkage between finance and growth

across countries. Second, our study provides evidence on the debate surrounding the law-finance-growth nexus (Levine 1998; Demirgüç-Kunt and Maksimovic, 1998; Beck et al., 2001; Beck et al., 2003). This paper explores the role of political risk in the relation between financial structures and economic development, which is a lack of prior research. We provide further evidence on the impact of financial structure varies across countries due to the heterogeneous nature of political risk.

Our work builds on Demirguc-Kunt et al. (2011) along the following three dimensions. First, it is based on a more recent sample period, covering 113 countries up to 2013. Second, we extend Demirguc-Kunt et al. (2011) by investigating, for the first time, the extent to which political risks affect the relationship between financial structure and economic growth. Third, our study further addresses endogeneity concern by employing instrumental variable (IV) and the system GMM approaches to provide clear evidence of a causal effect of the mixture of banks and markets on the economy, which supports and enriches the optimal structure statement in Demirguc-Kunt et al. (2011).

The remainder of the paper proceeds as follows. Section 2 reviews the literature and propose the hypotheses. Section 3 describes our models and methodologies. Section 4 introduces the database and presents summary statistics. Section 5 illustrates our main empirical results, while robustness tests are presented in Section 6. Section 7 concludes.

2. Hypotheses development

2.1 Comparative merits of banks and markets and political risks

An intensive debate has long been existing to investigate the comparative merits of bank-based versus market-based financial structures (for example, Bencivenga and Smith, 1991; Stulz, 2000; Levine, 1997; Boyd and Smith, 1998). Levine (2002) points out that a bank-based system has positive effects on, for example, acquiring information to improve capital allocation, managing cross-sectional and intertemporal risk to enhance investment efficiency, and mobilizing capital to exploit economies of scale. However, the literature suggests the important function of equity markets to overcome adverse selection and moral hazard problems. Levine (2002) summaries the positive role of equity markets in stimulating economic growth through the following three main channels. Firstly, equity markets foster greater incentives towards the monitoring of

firms, since trading in large and liquid markets benefits from information dissemination. Secondly, equity markets improve corporate governance by discipline enforced by liquid capital markets, the efficiency of equity-linked compensation, and the market for takeovers. Finally, equity markets enhance risk management by allowing individuals to diversify their risks by investing in a range of firms and mitigate information asymmetry by trading on liquid stock markets.

The financial development literature emphasizes the importance of equity markets increases over time. Demirguc-Kunt et al. (2011) suggest that equity markets tend to develop faster compared to banks. Generally, financial systems will become more market-based over time. Recent research shows that the importance of equity markets tends to be more pronounced after the 2008 financial crisis (Gambacorta et al., 2014; Langfield and Pagano, 2016). Therefore, the development of equity markets is crucial to economic growth.

Busse and Hefeker (2007) document that political risk components are generally linked to the quality of political institutions. For example, the quality of the bureaucracy is closely associated with the institutional strength of a country. Likewise, ensuring law and order and reducing corruption levels are essential determinants (and effects) of high-quality political institutions. They constitute relevant sub-components of an overall assessment of "good governance" (Kaufmann et al., 1999). Therefore, a country with lower political risk is generally expected to have stronger investor rights and lower financing frictions, thus resulting in lower financing costs and higher liquidity in equity markets. Erb et al. (1996) suggest that political risk is associated with equity returns and can also contribute to equity volatility. Lower political risks could lead to more robust investor protection. Therefore, investors in countries with lower political risk might feel more comfortable to extract relevant information about security prices and the prospects of firms' investment opportunities. A sound law system is a precondition for the development of equity markets.

However, when there is more political uncertainty, it could be difficult for equity markets to facilitate the feedback effects of security prices, which might cause market failure (e.g. failure of the price mechanism). Equity markets might face higher negative externalities and higher frictions and information asymmetry. For instance, some emerging economies, e.g. China is among the world's fastest-growing economies

despite under-developed equity markets. Financial institutions, e.g. banks might overcome negative externalities that stemmed from political risk. Banks have a stronger relationship with borrowers and have more specific knowledge of their borrowers compared to equity markets. They are also more risk-averse and can manage credit risks by requiring collaterals or substantial scrutiny. For instance, firms can obtain credits from banks when they have enough collateral used as a pledge or possess strong political connections (Berger and Udell, 1990). Therefore, when the economic and political environment is relatively uncertain, banks can be more effective at allocating credit and promoting economic growth compared to financial markets. Collectively, we therefore hypothesize that:

H1: *Market-based financial system is positively associated with economic growth, and this positive impact is more pronounced in countries with lower political risk.*

2.2 Development stage

Allen and Gale (2000) and Boyd and Smith (1998) argue that economic development increases the demand for the services provided by equity markets relative to the services provided by banks. As economies grow, markets tend to deliver stronger discipline than banks because investors would require more disclosure of information about corporate operations to protect their interests. Therefore, firms would benefit from a high level of information disclosure. Other stakeholders in the company such as creditors, employees, clients, suppliers also benefit from information and transparency. Therefore, as economies grow, the sensitivity of economic activity to bank development falls while the sensitivity of economic activity to market development increases. The comparative development of equity markets to banks will promote economic growth in countries with higher levels of economic development. Demirguc-Kunt et al. (2011) also find similar results that as economies grow, equity markets will be more effective at promoting growth. In the same vein, this leads to our second hypothesis:

H2: *The positive impact of market-based financial system on economic growth is more pronounced under higher levels of economic development.*

2.3 Over-market-based vs. over-bank-based financial systems

Boyd and Smith (1998) argue that there exists an optimal level of financial structure. If this is the case and countries might benefit from closing the deviation from

their optimal levels. Bank credit would contribute more to the economic growth in countries if a financial system is over-market-based (equity markets outweigh banks). In the over-market-based financial system, market development is not optimal given the existence of negative externalities, e.g., market failure on price mechanism, moral hazard, excessive speculation. Banks could be more effective in identifying good projects, managing risk, and allocating credits by addressing agency problems and short-termism (Stiglitz, 1985; Bhide, 1993). Similarly, equity markets should contribute more to the economic growth in the over-bank-based financial system, in which banks outweigh equity markets in this system because positive externalities prevail in equity markets. Demirguc-Kunt et al. (2011) find the financial structure gap — the deviations of a country's actual financial structure from the estimated optimal structure — is associated with lower economic activity. Therefore, the over-bank-based financial system and the over-market-based financial system are both harmful to economic activities. We thus expect if banks (equity markets) are beyond the optimal level of financial structure, equity markets (banks) play a more important role in economic growth. The above discussion leads to our third hypothesis:

H3: *Banks are more important to economic growth in over-market-based financial systems. However, equity markets are more important to economic growth in over-bank-based financial systems.*

3. Models and methodology

3.1 Baseline models

To assess the impact of the financial structure on economic growth, we adopted a standard model building on previous studies (see for instance, Rajan and Zingales, 1998; Beck and Levine, 2004). The baseline model is as follows[1]:

$$lnGDPpc_{i,t} = \beta_0 + \beta_1 lnGDPpc_{i,t-1} + \beta_2 FinStr_{i,t} + \beta_3 FinDev_{i,t} + \beta_4{}' Z_{i,t} + u_i + \mu_t + \varepsilon_{i,t}$$

where the subscript i indexes countries and t, years (t = 1990–2013). $lnGDPpc_{i,t}$ and $lnGDPpc_{i,t-1}$ are the logarithm of real GDP per capita for a country i at a period t and t-

[1] If subtracting $lnGDP_{i,t-1}$ on both sides of equation (1), the left-hand variable becomes economic growth.

1, respectively. $FinStr_{i,t}$ and $FinDev_{i,t}$ are the variables of interest accounting respectively for financial structure, i.e., Bank Credit/Market Capitalization, and financial development, i.e., (Bank Credit + Market Capitalization)/GDP. $Z_{i,t}$ is a set of control variables, including government expenditure, countries' openness (measured by the sum of import and export), human capital (measured by the average years of schooling) and inflation[2]; u_i and μ_t is country-specific and time-specific effects, respectively, which capture country growth patterns and business cycles, respectively. $\varepsilon_{i,t}$ is the error term. Furthermore, the coefficient (β_1) on $lnGDPpc_{i,t-1}$ is expected to be smaller than one, suggesting the convergence effect, i.e., the less developed countries are expected to have higher growth rates.

We augment Eq.(1) by interacting financial structure ($FinStr_{i,t}$) with $PoliRisk_{i,t}$, $lnGDPpc_{i,t-1}$ and $Dummy\_OECD_i$ and explore whether political risk, the level of economic development and an indicator of OECD countries affect the relationship between financial structure and economic growth. The modified equations are showing as follows:

$$lnGDPpc_{i,t} = \beta_0 + \beta_1 lnGDPpc_{i,t-1} + \beta_2 FinStr_{i,t} + \beta_3 PoliRisk_{i,t} + \beta_4 FinStr_{i,t} * PoliRisk_{i,t} + \beta_5 FinDev_{i,t} + \beta_6{}' Z_{i,t} + u_i + \mu_t + \varepsilon_{i,t} \quad (2)$$

$$lnGDP_{i,t} = \beta_0 + \beta_1 lnGDPpc_{i,t-1} + \beta_2 FinStr_{i,t} + \beta_3 FinStr_{i,t} * lnGDP_{i,t-1} + \beta_4 FinDev_{i,t} + \beta_5{}' Z_{i,t} + u_i + \mu_t + \varepsilon_{i,t} \quad (3)$$

$$lnGDP_{i,t} = \beta_0 + \beta_1 lnGDPpc_{i,t-1} + \beta_2 FinStr_{i,t} + \beta_3 FinStr_{i,t} * Dummy\_OECD_i + \beta_4 FinDev_{i,t} + \beta_5{}' Z_{i,t} + u_i + \mu_t + \varepsilon_{i,t} \quad (4)$$

where $PoliRisk_{i,t}$ is the measure of political risk for a country *i* at period *t*; $lnGDPpc_{i,t-1}$ is the level of economic development for a country *i* at period *t-1* and, *Dummy_OECD* is a dummy variable, which is equal to 1 if a country is an OECD member, and 0 otherwise.

3.2 Methodology

[2] The detailed definitions of all variables are shown in Table 1.

To assess how political risk and the level of economic development affect the relationship between financial structure and economic growth, we begin with the fixed effects (FE) estimates using 3-year non-overlapping periods.[3] Specifically, we use the average value of each variable for 3 years, to reduce the potential endogeneity problems.

To further address the potential endogeneity problems, we use both the Instrument Variable (IV) estimation and the System Generalized Method-of-Moment (GMM) estimation for robustness tests. More specifically, first, we follow LaPorta, Lopez-de-Silanes, Shleifer, and Vishny (1997) to use five dummies of Law Origin[4] (*Legor_uk, Legor_fr, Legor_so, Legor_ge, Legor_sc*) as instrument variables. Second, we use the System-GMM estimation, which is developed by Blundell and Bond (1998). The estimator combines two sets of equations. The first set includes first-differenced equations where the right-hand variables are instrumented by the levels of the series lagged one period or more. The second set consists of the equations in levels with the right-hand side variables being instrumented by lagged first of higher-order differences. The System-GMM has several advantages that the finance and growth literature has pointed out. This estimator takes into account country-specific effects while allowing addressing issues associated with endogeneity, measurement errors, and omitted variables. By exploiting internal instruments, the System GMM estimator overcomes the difficulties of identifying valid external instruments that are correlated with the endogenous explanatory variable but are not correlated with the error term of the equation.

4. Data and financial indicators

4.1 Databases

This study uses data taken from several sources. The economic growth indicator (*lnGDPpc)* is getting from the WDI (World Development Indicators). The financial structure indicator (*FinStr)* and financial development indicator (*FinDev)* are both collected from the GFDD (Global Financial Development Database). The GFDD is an extensive dataset of financial system characteristics for 203 economies. It contains annual data, starting from 1960. Both the WDI and GFDD are constructed by the World Bank. The political risk indicators are collected from the ICRG (International Country

[3] We also use 5-year non-overlapping periods in robustness tests, and the results are consistent.
[4] See more details in the Appendix 2.

Risk Guide). The ICRG rating comprises 22 variables in three subcategories of risk: political, financial, and economic risk. Among these, the Political Risk Rating includes 12 weighted variables covering both political and social attributes. The ICRG provides ratings for 140 countries on a monthly basis, and for an additional 26 countries on an annual basis under a different title.[5]

4.2 Measures of financial structure and development

Financial Structure. In line with Demirguc-Kunt et al. (2011), we adopt indicators of financial structure measuring the mixture of banks and markets operating in an economy, which is defined as the ratio of bank credit to securities market capitalization (*FinStr*). The goal is to gauge the degree to which the financial system is relatively bank-based or market-based. As shown in Table 2, the annual average value of the financial structure ratio is 3.34, with a median value at 1.51, indicating the right-skewed distribution of this variable. Therefore, we are expected to observe a larger proportion of the number of bank-based countries in our data. The high value of standard deviation (7.75) suggests that the financial structure ratio differs significantly across economies. In addition, we use two alternative measures of financial structure for robustness tests, namely, *FinStr2* (bank credit/value traded in stock market) and *FinStr3* (banks assets/market capitalization)[6].

Financial Development. We construct an indicator of financial development by combining both stock market and banking sector development. Similarly, stock market development is measured by market capitalization, and banking sector development is measured by bank credit. Therefore, the total financial development is constructed by the ratio of the total amount of bank credit and market capitalization to GDP. We recognize, however, that this type of measure captures only the contribution of the formal financial sector, leaving out the potentially important role of the informal finance, including e.g., microfinance and informal financial intermediaries. There are two reasons for this: (i) although the informal sector may represent a large number of institutions and loans, the aggregate credit that the informal sector provides is usually dwarfed by that of formal financial institutions; (ii) when the informal financial sector

[5] See Appendix 1 for the structure of the unbalanced panel used in estimation.

[6] Value traded in stock markets is measured by the value of stock market transactions. Market capitalization is measured by the sum of stock market capitalization and domestic private bond capitalization.

becomes economically substantive, they tend to be integrated into the formal sector.

4.3 Measures of political risk

Political Risk Indicators. We consider 5 indicators to measure political risk, namely, corruption, military in politics, democratic accountability, bureaucracy quality, and the total political risk[7]. The higher number of risk points indicates lower risk, whilst the lower number of risk points indicates higher risk.

Total Political Risk is the sum score of total 12 components. In general, if the points awarded are less than 50% of the total, the total political risk can be considered as very high. If the score is in the range from 50% to 59.9%, it signals high risk; in the 60%-69.9% range, moderate risk; in the 70%-79.9% range, low risk and in the 80%-100% range, very low risk. The score of this indicator varies from 0 to 1. Further, we focus on four perspectives about political risk, which are corruption, military in politics, democratic accountability and bureaucracy quality since these components are most effective and have the most significant impacts (Busse and Hefeker, 2007).

Corruption is an important political risk factor for investors for several reasons. First, corruption distorts the financial and economic environment. Second, it reduces the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability. Third, corruption introduces an inherent instability in the political process. Potentially, major scandals could provoke a widespread backlash, resulting in a fall or overthrow of the government, a major reorganizing or restructuring of the country's political institutions, or, at worst, a breakdown in law and order, rendering the country ungovernable. The score of this indicator varies from 0 to 6. A score of 6 points suggests a very low level of risk, and a score of 0 points indicates a very high level of risk.

Military in Politics also has significant implications. The military might, for example, become involved in government because of an actual or created internal or external threat. To overcome this threat, the government might increase the defence budget at the expense of other budget allocations. In some countries, the threat of

[7] Apart from these five indicators, the GFDD database also includes other political risk rating variables, for example, *Government Stability*, *Socioeconomic Conditions*, *Investment Profile*, *Internal Conflict*, *External Conflict*, but their data are available only from May 2001. In addition, the indicators such as *Religious, Ethnic Tensions* are correlated to *Democratic Accountability.*

military takeover can force an elected government to change the policy or cause its replacement by another government that is more amenable to the military's wishes. A military takeover or threat of a takeover may also represent a high risk, suggesting the government is unable to function effectively, and the country therefore has an uneasy environment for foreign businesses. Overall, lower risk scores indicate greater degrees of military participation in politics and higher levels of political risk. The score of this indicator also varies from 0 to 6.

Democratic Accountability is a measure of how responsive government is to its people. It is expected that the less responsive a government is, the more likely the government carry out repression and violence. According to the ICGR, types of governance are categorized to *Alternating Democracy*, *Dominated Democracy*, *De Facto One-Party State, De Jure One-Party State*, and *Autarchy*. In general, the higher scores of risk points (lowest risk) are assigned to *Alternating Democracies*, whilst the lowest scores of risk points (highest risk) are assigned to *Autarchies*. The score of this indicator varies from 0 to 6. A score of 6 points indicates a very low level of risk, and a score of 0 points indicates a very high level of risk.

Bureaucracy Quality is another shock absorber that tends to minimize revisions of policies when governments change. Therefore, high scores are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. However, countries that lack the cushioning effect of a strong bureaucracy have low points because changes in governments can tend to be traumatic in terms of policy formulation and day-to-day administrative functions. The score of this indicator also ranges from 0 to 6. A score of 6 points indicates a very low level of risk, and a score of 0 points indicates a very high level of risk.

Control Variables. In the baseline model, we include a set of control variables that are commonly used as factors explaining economic growth: government expenditure to GDP (*Gov*), to capture the contribution of government spending; economic openness (*Openness*), measured by the sum of import and export as a share of GDP, to capture the degree of international trade; human capital (*HumanCapital*), measured by average years of schooling, to capture the potential contribution of the labor. We also take *Inflation* (measured by GDP deflator) into account, to control for the macroeconomic environment.

[Insert Table 1 here]

4.4 Descriptive statistics

Table 2a presents descriptive statistics (sample means, medians, and standard deviations) for some main variables. We observe that the average *lnGDPpc* over 1990-2013 period is 8.68, with a standard deviation of 1.49. Compared with the same variable averaging at 7.58 in Demirguc-Kunt et al. (2011) between 1980 and 2008, our mean value is higher, which is expected due to rising economic growth. For the variable of financial structure (*FinStr*), our annual average value is 3.34, which is lower than 6.3 in Demirguc-Kunt et al. (2011), because as economies develop, the services provided by equity markets become comparatively more important than those provided by banks. Therefore, it is reasonable to believe that, with the time passing by, there is an overall decreasing trend of financial structure ratio (measured by bank credit/market capitalization)[8]. Turning to the variable of financial development (*FinDev*), the average value is 1.04, which is in line with Demirguc-Kunt et al.'s (2011) statistic at 1.07. We also include the variable of market efficiency and bank stability in robustness tests. The average values are shown as 0.463 and 0.155, respectively.

Regarding the control variables, government expenditure (*Gov*) constitutes 16% of GDP on average, which is consistent with the statistics published by the World Bank[9]. The value created by import and export (suggested by *Openness*) contributes more than 70% of GDP on average, which is consistent with Demirguc-Kunt et al. (2011). Human capital (*HumanCapital*), measured by average years of schooling, is 2.6 on average. Inflation is maintaining at a moderate level of 4.6% (if measured by the median of GDP deflator; *Inflation*) and 4.3% (if measured by the median of consumer price index; *Inflation2*). The mean value is higher than the median value because of the right-skewed distribution of the variable (*Inflation*). Foreign direct investment (*FDI*) constitutes 4.2% of GDP on average. Household consumption (*HHconsumption*) is the main economic diver of GDP growth, accounting for 61.6% on average. Capital formation (*Capital*) contributes 23% of GDP. The ratio of urban population (a geographic factor; *Urban*), and the ratio of working population (a demographic structure; *Age*) are 27.2%, and 35.8%

[8] Based on our sample from 1990 to 2013, the average value of financial structure before and after year 2000 is 3.92 and 3.07, respectively. For robustness, when we split our sample into three periods, i.e. 1990-1995, 1995-2005, and 2005-2013, the average value of this ratio is 4.28, 3.47, and 2.73, respectively.

[9] For more information, see in https://data.worldbank.org/indicator/ne.con.govt.zs.

on average, respectively. Comparing with different political risk indicators, military in politics and democratic accountability show relatively higher scores, indicating lower political risks, where corruption and bureaucracy quality present relatively lower scores, suggesting higher political risks.

[Insert Table 2a & 2b here]

According to the correlation matrix in Table 2b, there is a significantly positive correlation (0.61) between financial development with the dependent variable (economic growth). The correction between the variable of financial structure (*FinStr*) and *lnGDPpc* is significantly negative, however the magnitude is relatively small (-0.10). These suggest that financial development might enhance economic growth. In line with Hypothesis 1, the comparative development of equity markets to banks will promote economic growth. Additionally, the majority of the absolute values of correlation coefficients between independent variables are all smaller than 0.2, except for the highest correlation between *HumanCapital* and *lnGDPpc* at 0.74. It can be explained that a country's human capital is highly correlated with economic development. Based on the information from the correlation matrix, moderate multicollinearity is not problematic in our regressions.

5 Empirical results

5.4 The baseline regression and preliminary results

In this section, we estimate Eq. (1) to understand to what extent financial structure affects economic growth. Table 3 presents the results. In all specifications, the coefficients on financial structure indicators are significant and negative, suggesting that the development of equity markets compared to banks will promote economic growth[10]. Given the magnitude of the coefficient estimate of -0.002, one standard deviation decrease in $FinStr_{i,t}$ (7.7) is associated with a 1.5% increase in logarithm of real GDP per capita, which is economically significant. Our results are consistent after controlling for different sets of country characteristics as well as country fixed effects, time fixed effects, and country-specific business cycles (income group interacted with

[10] We also consider the potential impacts of financial crises in year 1998 and 2008. In unreported results, we find the coefficients on financial structure remain significant and negative before and after the crises. The results are not presented here but available upon request.

time dummies) that have been widely employed in the prior development studies. Our results are in line with Demirguc-Kunt et al. (2011), who suggest that, as economies develop, the services provided by equity markets become more important than those provided by banks. Therefore, the development of equity markets (market-based financial system) will play a more important role in economic growth. Turning results about the lagged variable of *lnGDPpc*, the coefficients are positive but small that 1, suggesting the convergence effect in economic growth.

[Insert Table 3 here]

The results related to the control variables are mostly in line with expectations. There is a strong negative relationship between government expenditure and economic growth. This finding is consistent with Hansson and Henrekson (1994), who utilize disaggregated data and find that government transfers, consumption, and total outlays have negative effects. In addition, financial development appears to have no significant impact on economic growth. The possible reason is that the impact of financial development on economic growth is captured by financial structure (Demirguc-Kunt and Maksimovic, 1998; Levine and Zervos, 1998; Beck and Levine, 2004). After taking consideration of country and time effects, openness and human capital are not robustly linked to economic growth, probably because any association between these two variables and economic growth are already captured by financial channels through bank credit and market capitalization. The coefficient associated with inflation is significant and negative, suggesting that there is a negative impact of inflation on economic growth.

5.5 Model results with political risk

In this subsection, we examine how political risk affects the relation between financial structure and economic growth. The results are presented in Table 4. In column 1 (referring to the total political risk), we introduce the level of total political risk and its interaction with the financial structure. In line with Hypothesis 1, the coefficients associated with the interaction term between financial structure and political risk is significant and negative, suggesting that the negative impact of financial structure on economic growth is more pronounced if the level of political risk is small.[11]

[11] Higher values of political risk indicates lower political risks.

Considering the magnitude of coefficient on the interaction term (-0.02), the negative impact of financial structure on economic growth increases by 0.2% (0.2%=0.02*0.1) in response to a one standard deviation drop in political risk (0.1). These results also suggest that in countries with less political risk, the development of equity markets relative to banks will promote more economic growth. By contrast, in countries with more political risk, the development of bank-based systems become more important compared to the development of market-based systems.

[Insert Table 4 here]

Columns 2-5 of Table 4 present the estimates, which look at the role of different components of political risk (i.e., corruption, military in politics, democratic and bureaucracy quality) on the impact of financial structure on economic growth. These results based on different political risk components are in line with the finding based on total political risk in column 1. The interaction terms between political risk and financial structure are significant and negative. The magnitudes of the interaction coefficients are higher for *Corruption* and *Bureaucracy Quality* compared with the ones for *Military in Politics* and *Democratic Accountability*. These findings suggest political risk, particularly corruption and bureaucracy quality can significantly moderate the impact of financial structure on economic growth. The development of equity markets appears to promote more economic growth in countries with less political risk.

Turning to the control variables, government expenditure and inflation are negatively and significantly associated with economic growth, while openness is positively and significantly associated with economic growth, which is in line with the previous analysis. While the single term of $FinStr_{i,t}$ is not particularly interesting in all regressions given that the main effects of $FinStr_{i,t}$ only imply when the value of political risk is equal to zero. The same applies to the single terms of political risks. However, if we only include the single term of political risks in the regressions, we find the positive and significant coefficient (0.005) on the indicator of total political risk, suggesting that lower levels of political risk are associated with higher levels of economic growth. In short, introducing the political risk in our model sheds more light on the complexity of the relationship between financial structure and economic growth.

5.6 Model results with development stage

In this section, we augment our baseline tests by interacting countries' development stage ($lnGDP_{i,t-1}$) with financial structure and present the results in Table 5. Our main variable of interest is the interaction term between $FinStr_{i,t}$ and $lnGDP_{i,t-1}$, which is significant and negative. Consistent with Hypothesis 2, we find the impact of financial structure on growth response to economic development across different specifications. Specifically, as economies develop, growth will rely more on the development of market-based financial systems compared to the development of bank-based systems. The magnitude of coefficient (-0.001) suggests that the positive impact of equity markets on economic growth increase by 0.15% (0.15%=0.001*1.5) in response to a one standard deviation increase in *lnGDPpc (1.5)*. Our results are robust to a variety of additional control variables, i.e., financial development, openness, human capital, inflation in columns 2-5. These control variables are also consistent with prior studies.

[Insert Table 5 here]

Next, we explore whether the impact of financial structure on economic growth is different between OECD and non-OECD countries. The rationale for differentiating between OECD and non-OECD countries is that most OECD members are developed countries with high income and low political risk[12]. If this is the case, we should expect that the growth of OECD countries benefits more from the development of market-based systems compared to the development of bank-based systems. Column 6 of Table 5 presents the results. We interact financial structure with a dummy variable on OECD ($Dummy\_OECD_{i,t}$), which equals 1 if a country is an OCED member, and 0 otherwise. As expected, we find negative and significant coefficients on the interaction between $FinStr_{i,t,}$ and $Dummy\_OECD_{i,t}$ suggesting that the development of market-based systems promotes more economic growth in OECD countries compared to non-OECD

[12] Most of the OECD countries are located in Europe and North America, in addition to Japan and Korea in Asia, and Australia and New Zealand in Oceania. It is widely accepted both in media, for example, the BBC (see https://www.bbc.co.uk/news/business-41652416 which reports that "the OECD members are mainly the rich countries"), and in academia, for example, Smith (2015), that most of the OECD members are developed countries with a high-income economy. We can also observe from our data that the logarithm of real GDP per capita in OECD countries is 10.13 while it is 7.79 in non-OECD countries. Although OECD is an international economic organization, it naturally represents a more developed group with higher-income countries. As a robust, we interact the variable of financial structure with the level of income as well as the indicators of political risk. We find that similar results to those in Tables 4 and 5, in which the coefficients on the interaction terms are consistently negative. The results are not presented here but available upon request.

group. The magnitude of coefficient (0.01) shows that the impact of equity markets on growth is about 1% higher in OECD countries compared to non-OECD group, which is in line with Hypotheses 1 and 2.

In short, these results in this section indicate that the relationship between the financial structure and economic growth varies with different stages of economic development. The negative (positive) association between bank-based (market-based) financial system and economic growth will strengthen at a higher stage of economic development.

5.7 Over-market-based Vs. over-bank-based financial systems

In previous sections, we show countries with different levels of political risk and economic development respond differently to different financial structure—the mixture of bank-based and market-based systems. These findings might imply that the optimal level of financial structure varies across different countries. Boyd and Smith (1998) demonstrate that there exists an optimal level of financial structure, which is subject to income per capita. In this section, we further provide tests for Hypothesis 3 and to what extent the deviation from the optimal capital structure affects economic growth.

To this end, we first need to identify the optimal financial structure for each country. Following the methods in Rajan and Zingales (1998) and Demirguc-Kunt et al. (2011), we build up a model to predict an optimal level of financial structure for each economy. We then regress the financial structure ratio on a set of key national traits that might affect each country's optimal financial structure. These factors include, first and foremost, real GDP per capita, which captures the insights that the optimal mixture of banks and markets changes as economies develop. Second, dummy variables for the legal origin of the country (English, French, Scandinavian, with German as the omitted category). Prior research suggests that the common law is more conductive to securities market development (La Porta et al., 1998). Therefore, the optimal financial structure in such countries will be more likely to be market-based. Further, countries' distance to the equator, population size, and density, along with the role of natural resources in the economy as discussed in Beck (2010) and Haber and Menaldo (2011) are used in the research to control for the geographic characteristics and economic structure of the

countries. The regressions are then estimated using the country fixed effects estimator.[13] The residuals from the regressions can be either positive or negative. We group a country as "too" bank-based if the residual is positive, and as "too" market-based if the residual is negative. Next, we re-estimate Eq. (1) using these two subsamples: over-bank-based and over-market-based subsamples. The results are reported in Table 6.

[Insert Table 6 here]

In column 1, we consider a country to be over-market-based in a given year if its residual from the regression is negative. We observe a significantly positive coefficient on $FinStr_{i,t}$, suggesting that if a country's capital structure deviates from the optimal level and become over-market-based, bank credit markets have a positive impact on economic growth. In column 2, we consider a country to be over-bank-based in a given year if its residual from the regression is positive. We observe a significantly negative coefficient on $FinStr_{i,t.}$ This result suggests that if a country's capital structure deviates from the optimal level and become over-bank-based, equity markets (securities market capitalization) tend to have a positive impact on economic growth.

The overall results suggest that the development of banks is more important in over-market-based countries, whilst equity markets play a more important role in over-bank-based countries.

6. Robustness tests

6.1. Methods of addressing endogeneity

One potential concern is that economic development/growth could impact the development of bank credit and market capitalization, and thus change a country's optimal financial structure. Therefore, endogeneity (reverse causality) could be a potential problem that biases the results. To address this concern, we use the system-GMM (GMM) and the instrumental variable (IV) estimators and re-estimate Eq. (1).

Columns 1-3 of Table 7 presents the results based on the GMM estimation. We treat all regressors as being potentially endogenous. Levels of endogenous variables lagged twice, and further are used as instruments in the first-differenced equations and

[13] The results are showing in column 1 of Appendix 2. We also provide robustness test without country fixed effects in column 2 of Appendix 2, and the results are consistent.

first-differences of these same variables dated twice are used as additional instruments in the level equations. The results remain qualitatively the same, which show the coefficients on financial structure are significantly negative across all specifications. As suggested by Arellano and Bond (1991) and Blundell and Bond (1998), a Sargan/Hansen test of over-identifying restrictions and a serial correlation test (AR2) were carried out. In both instances, the null hypothesis could not be rejected (the instrumental variables are not correlated with the residual, and the errors exhibit no second-order serial correlation), indicating the validity of instruments and the well specification of the models.

[Insert Table 7 here]

Columns 4-6 correspond the results based on the IV estimator. Following Beck et al. (2003), we use the dummies of Law Origin as the instrument variables for capital structure to force the exogenous portion of capital structure to explain economic growth. This instrumental variable (legal origin) satisfies the criteria of good instrument: the instruments are highly correlated with financial development as well as capital structure. According to Beck et al. (2003), legal origin influences financial development mainly through the "adaptability" channel. Specifically, legal origin differs in their ability to adjust to evolving economic conditions. Legal traditions support financial development by adapting efficiently to minimize the gap between financial needs and legal capabilities and eliminate inefficient laws. For example, British Common law countries are more likely to develop efficient legal systems than French legal origin countries. However, legal traditions were spread mainly through conquest and imperialism, which can be seen as an exogenous endowment. It is doubtful that current-year economic output can directly affect legal traditions, which can be seen as an exogenous factor for each nation. These results confirm once our hypothesis according to which $FinStr_{i,t}$ is significantly and negatively associated with growth. On average, the development of equity markets relative to banks promotes more economic growth. The Tables also present the F-statistics (6.22-6.54) associated with the first stage regressions, which are lower than the rule of thumb of 10 (Stock & Yogo 2005), suggesting there is weak instrument problem[14].

[14] The dummies of Law Origin do not have enough time and cross-sectional variations, which might cause a weak instrument problem.

6.2. Alternative measurements of financial structure

To control for measurement errors, we further use two alternative ways to measure financial structure: firstly, the ratio of bank credit to value traded in equity markets, namely, *FinStr2*; secondly, the ratio of bank assets to market capitalization, namely, *FinStr3*. The former (*FinStr2)* accounts for the activity or liquidity of stock markets, and the latter (*FinStr3)* accounts for the overall size of banking sector. Columns 1-5 of Table 8 are estimated based on *FinStr2,* columns 6-10 correspond to *FinStr3.* Again, we find that regardless of what measures of financial structure, across all specifications, there is a significant and negative relationship between capital structure and economic growth, suggesting the development of equity markets relative to banks appears to promote more economic growth.

[Insert Table 8 here]

6.3. Additional control variables

To mitigate concerns about omitted factors that may explain economic development/growth, we add more control variables in the model. The results are presented in Table 9. These additional variables include: *Urban*, which is measured by urban population to total population. As suggested by Zhang and Cheng (2009), urban population seems to move more closely with GDP than rural population, as they tend to consume more than the rural area. We thus expect a positive relationship between *Urban* and economic growth. *Capital* is measured by capital formation as a share of GDP. This variable could have a more positive influence in developing countries, especially in the early stages. *DeathRate* (measured by population death rate) and *Age* (measured by population share for ages younger than 14 and older than 65; used to capture the workforce) are expected to have a negative influence. *FDI* (measured by foreign direct investment as a share of GDP) attract foreign investment, and therefore, its coefficient is expected to be positive. *HHconsumption* (measured by household consumption as a share of GDP) is also expected to have a positive connection with economic growth. After controlling for all these additional variables, we find similar results to those of our baseline regression that the coefficients on *FinStr* are still significant and negative across different specifications. In columns 7 and 8, we also use

the consumer price index to measure inflation (labelled as Inflation2) for robustness tests. All results remain unchanged.

7. Conclusion

This paper examines the link between financial structure and economic growth based on a sample of 113 economies over the period 1990 to 2013. We pay particular attention to the role of political risk, development stage (e.g., economic development and financial market development), and the deviation from the optimal capital structure to assess their moderation effects on the relation between financial structure and economic growth. The results suggest that overall a more market-based financial system (the development of equity markets relative to banks) is associated with a higher level of economic growth, and this impact increases with lower political risk. In addition, our findings are consistent with the views that banks play a more important role at earlier stages of economic development, but equity markets start to have more influence as the economy develops. Moreover, bank credit is more crucial to economic growth in over-market-based financial systems, while market capitalization is more sensitive to economic growth in over-bank-based financial systems.

Given the fact of countries' heterogeneity, cross-country evidence helps better understand the complexity of the relationship between financial structure and economic growth. It stresses the importance of taking into account by considering political risk e.g., such as the quality of the bureaucracy and corruption and development stage (the deviation from the optimal level of capital structure). Markets are not perfect given the existence of negative externalities, especially in countries with low levels of economic development, high levels of political risk, and in over-market-based financial systems. This research provides additional evidence for policymakers to decide the optimal mixture of banks and equity markets in different stages to benefit a country's economic growth.

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Table 1: Variables Definition

Variables	Definition	Origin
lnGDPpc	Logarithm of real GDP per capita	WDI
FinStr	Bank Credit / Market Capitalization	GFDD
FinStr2	Bank Credit / Value Traded in Stock Market	GFDD
FinStr3	Banks Assets / Market Capitalization	GFDD
FinDev	(Bank Credit + Market Capitalization) / GDP	GFDD
MarketEfficiency	Turnover ratio of stock market	GFDD
BankStablity	Averaged Z-score of banks	GFDD
Information Set for Growth Model		
Gov	Government expenditure as a share of GDP	WDI
Openness	Sum of import and export as a share of GDP	WDI
HumanCapital	Average years of schooling (Barro and Lee, 1996)	PWT 8.0
Inflation	GDP deflator	WDI
Inflation2	Consumer price index	WDI
DeathRate	Death rate	WDI
FDI	Foreign direct investment as a share of GDP	WDI
HHconsumption	Household consumption as a share of GDP	WDI
Capital	Capital formation as a share of GDP	WDI
Urban	Urban population / total population	WDI
Age	Population share for years old <14 and >65	WDI
Political Risk Indicators		
TotalPoliticalRisk	Sum of 12 indicators on political risk over 100	ICRG
Corruption	Corruption	ICRG
MilitaryinPolitics	Military in politics	ICRG
Democratic	Democratic Accountability	ICRG
BureauQuality	Bureaucratic quality	ICRG
Legal System Origin		
Legor_uk	Dummy, =1 if legal origin is UK law	LLSV(1997)
Legor_fr	Dummy, =1 if legal origin is French law	LLSV(1997)
Legor_so	Dummy, =1 if legal origin is Socialist law	LLSV(1997)
Legor_ge	Dummy, =1 if legal origin is Germany law	LLSV(1997)
Legor_sc	Dummy, =1 if legal origin is Scandinavia law	LLSV(1997)

Table 2a: Summary statistics

Variables	(1) Observations	(2) Median	(3) Mean	(4) Std. Dev
lnGDPpc	702	8.661	8.679	1.485
FinStr	702	1.506	3.337	7.746
FinStr2	690	0.072	1.210	8.780
FinStr3	702	1.956	4.134	9.225
FinDev	702	0.759	1.041	0.839
MarketEfficiency	694	0.259	0.463	0.582
BankStablity	473	0.141	0.155	0.104
Information Set for Growth Model				
Gov	702	0.164	0.161	0.051
Openness	701	0.751	0.860	0.496
HumanCapital	653	2.699	2.628	0.462
Inflation	702	0.046	0.166	1.181
Inflation2	689	0.043	0.161	1.279
DeathRate	699	0.082	0.085	0.032
FDI	691	0.026	0.042	0.078
HHconsumption	701	0.618	0.616	0.127
Capital	702	0.227	0.234	0.062
Urban	536	0.221	0.272	0.191
Age	698	0.342	0.358	0.055
Political Risk Indicators				
TotalPoliticalRisk	548	0.570	0.567	0.101
Corruption	548	3.000	3.313	1.331
MilitaryinPolitics	548	5.000	4.511	1.462
Democratic	548	4.917	4.413	1.511
BureauQuality	548	2.590	2.704	0.971
Number of Countries	113			

Note: This table provides the summary statistics (observations, median, mean, standard deviation) for all variables. See more details and definitions of these variables in Table 1.

Table 2b: Correlation Matrix

	lnGDPpc	*FinStr*	*FinDev*	*Openness*	*Gov*	*Inflation*
FinStr	-0.0998***					
FinDev	0.6141***	-0.1842***				
Openness	0.2443***	-0.0516	0.411***			
Gov	0.2805***	-0.0778**	0.1381***	0.1326***		
Inflation	-0.0816***	0.0306	-0.1162***	-0.0244	-0.001	
HumanCapital	0.7497***	-0.0683*	0.3882***	0.2595***	0.3454***	-0.0070

Note: This table provides the correlation matrix for some key variables. See more details and definitions of these variables in Table 1.

Table 3: Baseline model: financial structure and economic growth

	(1) *lnGDPpc*	(2) *lnGDPpc*	(3) *lnGDPpc*	(4) *lnGDPpc*	(5) *lnGDPpc*
L.lnGDPpc	0.825***	0.826***	0.835***	0.852***	0.782***
	(0.0234)	(0.0237)	(0.0240)	(0.0237)	(0.0263)
FinStr	-0.00172***	-0.00173***	-0.00178***	-0.00171***	-0.00136***
	(0.000476)	(0.000478)	(0.000493)	(0.000481)	(0.000473)
Gov	-0.527***	-0.518***	-0.537***	-0.645***	-0.542***
	(0.141)	(0.143)	(0.152)	(0.150)	(0.161)
FinDev		-0.000824	0.00245	0.00198	0.0129
		(0.00943)	(0.00941)	(0.00919)	(0.00971)
Openness		-0.00447	-0.00783	-0.00540	0.0410
		(0.0237)	(0.0237)	(0.0232)	(0.0256)
HumanCapital			0.0635	0.0429	-0.0201
			(0.0440)	(0.0431)	(0.0452)
Inflation				-0.0115***	-0.00921***
				(0.00222)	(0.00223)
Constant	1.620***	1.615***	1.402***	1.335***	2.070***
	(0.195)	(0.197)	(0.223)	(0.218)	(0.243)
Observations	702	701	653	653	578
R-squared	0.901	0.901	0.906	0.910	0.912
Number of Countries	113	113	100	100	100
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
*Income Group * Year*	NO	NO	NO	NO	YES

Notes: This table provides the coefficient estimates of Eq. (1) testing the effect of financial structure on economic growth. The dependent variable *lnGDPpc* is the logarithm of real GDP per capita. The independent variable *FinStr* is measured as the ratio bank credit to market capitalization. See Table 1 for definitions of all other control variables. Heteroskedasticity-consistent standard errors are reported in parentheses. We control for country fixed effects and year fixed effects in columns 1-5, We further control for income-year effects in column (6). ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 4: Financial structure-growth nexus and political risk

	(1) lnGDPpc	(2) lnGDPpc	(3) lnGDPpc	(4) lnGDPpc	(5) lnGDPpc
L.lnGDPpc	0.766***	0.762***	0.779***	0.780***	0.759***
	(0.0269)	(0.0273)	(0.0276)	(0.0276)	(0.0279)
FinStr	0.00693*	0.00371***	0.00154	0.000650	0.00353*
	(0.00374)	(0.00131)	(0.00125)	(0.000950)	(0.00191)
Gov	-0.486***	-0.439***	-0.490***	-0.481***	-0.466***
	(0.167)	(0.169)	(0.169)	(0.172)	(0.171)
FinDev	0.0109	0.0158	0.0131	0.0153	0.0157
	(0.00978)	(0.00986)	(0.00994)	(0.0100)	(0.00993)
Openness	0.0647**	0.0458*	0.0383	0.0443*	0.0381
	(0.0264)	(0.0265)	(0.0264)	(0.0268)	(0.0266)
HumanCapital	-0.0289	-0.0550	-0.0310	-0.0443	-0.0378
	(0.0462)	(0.0470)	(0.0470)	(0.0477)	(0.0471)
Inlfation	-0.00824***	-0.00871***	-0.00833***	-0.00908***	-0.00844***
	(0.00217)	(0.00220)	(0.00221)	(0.00224)	(0.00222)
FinStr TotalPoliticalRisk*	-0.0155**				
	(0.00682)				
*FinStr*Corruption*		-0.00207***			
		(0.000499)			
*FinStr *MilitaryinPolitics*			-0.000798**		
			(0.000320)		
*FinStr *Democratic*				-0.000623**	
				(0.000254)	
*FinStr *BureauQuality*					-0.00254***
					(0.000955)
TotalPoliticalRisk	0.465***				
	(0.0888)				
Corruption		0.00851			
		(0.00552)			
MilitaryinPolitics			0.0167***		
			(0.00502)		
Democratic				-0.000178	
				(0.00403)	
BureauQuality					0.0241***
					(0.00799)
Constant	1.957***	2.297***	2.054***	2.148***	2.251***
	(0.250)	(0.254)	(0.254)	(0.255)	(0.254)
Observations	527	527	527	527	527
R-squared	0.918	0.916	0.915	0.914	0.915
Number of Countries	92	92	92	92	92
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
*Income Group * Year*	YES	YES	YES	YES	YES

Notes: This table provides the coefficient estimates of Eq. (2) testing the impact of political risk on the relationship between financial structure and economic growth. The dependent variable *lnGDPpc* is the logarithm of real GDP per capita. The independent variable *FinStr* is measured as the ratio bank credit to market capitalization. See Table 1 for definitions of all other control variables including political risk variables. Heteroskedasticity-consistent standard errors are reported in parentheses. We control for country, year and income-year effects in all specifications. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 5: Financial structure-growth nexus and development stage

	(1) *lnGDPpc*	(2) *lnGDPpc*	(3) *lnGDPpc*	(4) *lnGDPpc*	(5) *lnGDPpc*	(6) *lnGDPpc*
L.lnGDPpc	0.773***	0.770***	0.766***	0.775***	0.795***	0.787***
	(0.0266)	(0.0267)	(0.0267)	(0.0266)	(0.0266)	(0.0261)
FinStr	0.00614*	0.00639**	0.00687**	0.00725**	0.00678**	-0.00119**
	(0.00315)	(0.00315)	(0.00315)	(0.00311)	(0.00305)	(0.000472)
FinStr L.lnGDPpc*	-0.00099**	-0.00102**	-0.00108**	-0.00118***	-0.00111***	
	(0.000422)	(0.000422)	(0.000422)	(0.000417)	(0.000411)	
FinStr Dummy_OECD*						-0.0116***
						(0.00378)
Gov	-0.478***	-0.473***	-0.452***	-0.455***	-0.543***	-0.501***
	(0.149)	(0.149)	(0.151)	(0.161)	(0.160)	(0.160)
FinDev		0.0155	0.0161	0.0158	0.0143	0.0152
		(0.00996)	(0.00995)	(0.00982)	(0.00966)	(0.00965)
Openness			0.0509*	0.0476*	0.0464*	0.0282
			(0.0261)	(0.0260)	(0.0255)	(0.0257)
HumanCapital				-0.0168	-0.0230	-0.0302
				(0.0456)	(0.0449)	(0.0449)
Inflation					-0.00895***	-0.00921***
					(0.00221)	(0.00220)
Constant	2.107***	2.132***	2.124***	2.108***	1.965***	2.065***
	(0.221)	(0.222)	(0.222)	(0.246)	(0.245)	(0.241)
Observations	618	618	617	578	578	578
R-squared	0.904	0.905	0.906	0.911	0.914	0.914
Number of Countries	113	113	113	100	100	100
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
*Income Group * Year*	YES	YES	YES	YES	YES	YES

Notes: This table provides the coefficient estimates of Eq. (3) in columns 1-5 testing the impact of economic development on the relationship between financial structure and economic growth. In column 6, we test the difference between OECD countries and non-OECD countries. The dependent variable *lnGDPpc* is the logarithm of real GDP per capita. The independent variable *FinStr* is measured as the ratio bank credit to market capitalization. See Table 1 for definitions of all other control variables including political risk variables. Heteroskedasticity-consistent standard errors are reported in parentheses. We control for country, year and income-year effects in all specifications. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 6: Financial structure-growth nexus in over-market-based and over-bank-based financial systems

	(1) Market-Based	(2) Bank-Based
L.lnGDPpc	0.756***	0.866***
	(0.0471)	(0.0606)
FinStr	0.00888*	-0.00116*
	(0.00534)	(0.000683)
Gov	-0.554**	-0.788**
	(0.265)	(0.314)
FinDev	0.00952	-0.0180
	(0.0133)	(0.0201)
Openness	0.00500	0.136***
	(0.0453)	(0.0481)
HumanCapital	-0.0458	-0.0243
	(0.0761)	(0.0693)
Inlfation	-0.00852***	-0.127
	(0.00254)	(0.166)
Constant	2.286***	1.457**
	(0.391)	(0.600)
Observations	321	181
R-squared	0.902	0.950
Number of countries	79	58
Country FE	YES	YES
Year FE	YES	YES
*Income Group * Year*	YES	YES

Notes: This table provides the coefficient estimates of Eq. (1) testing the impact of financial structure on economic growth in over-bank-based and over-market-based sub-samples. See more details in Appendix 2 on how to classify the sample into over-bank-based and over-market-based groups. The dependent variable *lnGDPpc* is the logarithm of real GDP per capita. The independent variable *FinStr* is measured as the ratio bank credit to market capitalization. See Table 1 for definitions of all other control variables including political risk variables. Heteroskedasticity-consistent standard errors are reported in parentheses. We control for country, year and income-year effects in both specifications. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 7: Robustness tests: Controlling for endogeneity using the system-GMM and IV methods

	System-GMM			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*
L.lnGDPpc	0.964***	0.980***	0.977***	0.759***	0.758***	0.783***
	(0.0199)	(0.0222)	(0.0243)	(0.0344)	(0.0350)	(0.0336)
FinStr	-0.00270**	-0.00109**	-0.00105*	-0.00928**	-0.00957**	-0.00837**
	(0.000559)	(0.000530)	(0.000535)	(0.00433)	(0.00415)	(0.00407)
Gov	-0.280**	-0.373	-0.416	-0.477**	-0.456**	-0.551***
	(0.138)	(0.314)	(0.405)	(0.207)	(0.214)	(0.209)
FinDev	-0.0285***	-0.0321*	-0.0338**	0.0142	0.0144	0.0104
	(0.0092)	(0.0173)	(0.0164)	(0.0128)	(0.0130)	(0.0121)
Openness		0.0380**	0.0539***		0.0170	0.0268
		(0.0176)	(0.0197)		(0.0352)	(0.0329)
HumanCapital			0.105			-0.0961
			(0.0726)			(0.0727)
Inflation			0.0376			-0.00842***
			(0.106)			(0.00283)
Constant	0.587***	0.397*	-0.517	2.251***	2.247***	2.285***
	(0.214)	(0.206)	(0.656)	(0.291)	(0.296)	(0.342)
Observations	618	617	578	561	560	540
Number of countries	113	113	100	100	100	93
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
*Income Group*Year*	YES	YES	YES	YES	YES	YES
First stage F-stat				6.22	6.22	6.54
AR2 (p-value)	0.106	0.638	0.451			
Sargan test (p-value)	0.198	0.154	0.969			

Notes: This table provides the robustness tests using the system-GMM (columns 1-3) and IV (columns3-6) methods. The dependent variable *lnGDPpc* is the logarithm of real GDP per capita. The independent variable *FinStr* is measured as the ratio bank credit to market capitalization. See Table 1 for definitions of all other control variables including political risk variables. Heteroskedasticity-consistent standard errors are reported in parentheses. We control for country, year and income-year effects in all specifications. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 8: Robustness tests: Alternative measures of financial Structure

	FinStr2					*FinStr3*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	lnGDPpc	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*	*lnGDPpc*
L.lnGDPpc	0.833***	0.843***	0.854***	0.870***	0.796***	0.825***	0.827***	0.835***	0.852***	0.782***
	(0.0232)	(0.0234)	(0.0236)	(0.0232)	(0.0253)	(0.0234)	(0.0237)	(0.0239)	(0.0236)	(0.0262)
*FinStr**	-0.000995***	-0.000988***	-0.00100***	-0.00100***	-0.000982***	-0.00163***	-0.00164***	-0.00173***	-0.00162***	-0.00141***
	(0.000329)	(0.000324)	(0.000318)	(0.000310)	(0.000288)	(0.000407)	(0.000408)	(0.000424)	(0.000415)	(0.000407)
Gov	-0.394***	-0.445***	-0.436***	-0.548***	-0.411***	-0.518***	-0.509***	-0.531***	-0.637***	-0.538***
	(0.141)	(0.141)	(0.150)	(0.148)	(0.157)	(0.141)	(0.143)	(0.151)	(0.149)	(0.160)
Openness		-0.00431	-0.000513	-0.000708	0.00999		-0.00529	-0.00862	-0.00613	0.0403
		(0.00928)	(0.00923)	(0.00900)	(0.00934)		(0.0236)	(0.0237)	(0.0232)	(0.0255)
FinDev		-0.00716	-0.0122	-0.0102	0.0376		-0.00140	0.00183	0.00141	0.0125
		(0.0235)	(0.0234)	(0.0229)	(0.0250)		(0.00940)	(0.00938)	(0.00917)	(0.00967)
HumanCapital			0.0792*	0.0577	-0.00948			0.0628	0.0428	-0.0208
			(0.0432)	(0.0423)	(0.0439)			(0.0438)	(0.0430)	(0.0450)
Inlfation				-0.0115***	-0.00923***				-0.0113***	-0.00899***
				(0.00216)	(0.00213)				(0.00222)	(0.00222)
Constant	1.526***	1.460***	1.191***	1.128***	1.901***	1.620***	1.614***	1.403***	1.336***	2.073***
	(0.194)	(0.195)	(0.219)	(0.214)	(0.235)	(0.194)	(0.197)	(0.222)	(0.218)	(0.242)
Observations	697	689	642	642	568	702	701	653	653	578
R-squared	0.904	0.906	0.911	0.915	0.920	0.902	0.902	0.906	0.911	0.913
Number of Countries	111	111	99	99	99	113	113	100	100	100
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
*Income Group * Year*	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES

Notes: This table provides the robustness tests using alternative measures of financial structure. The dependent variable *lnGDPpc* is the logarithm of real GDP per capita. Financial structure *FinStr2* in columns 1-5 is measured by the ratio of bank credit to value traded in stock markets. Financial structure *FinStr2* in columns 6-10 is measured by the ratio of bank assets to market capitalization. See Table 1 for definitions of all other control variables. Heteroskedasticity-consistent standard errors are reported in parentheses. We control for country fixed effects and year fixed effects in columns 1-4 and 5-9. We further control for income-year effects in columns 5 and 10. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 9: Robustness test: Information set

	(1) *lnGDPpc*	(2) *lnGDPpc*	(3) *lnGDPpc*	(4) *lnGDPpc*	(5) *lnGDPpc*	(6) *lnGDPpc*	(7) *lnGDPpc*	(8) *lnGDPpc*
L.lnGDPpc	0.790***	0.784***	0.783***	0.782***	0.769***	0.759***	0.763***	0.760***
	(0.0306)	(0.0282)	(0.0283)	(0.0287)	(0.0287)	(0.0291)	(0.0249)	(0.0278)
FinStr	-0.00132***	-0.00128***	-0.00122***	-0.00122***	-0.00115**	-0.00111**	-0.00140***	-0.00122***
	(0.000497)	(0.000459)	(0.000458)	(0.000459)	(0.000454)	(0.000453)	(0.000442)	(0.000428)
Gov	-0.566***	-0.486***	-0.513***	-0.514***	-0.569***	-0.501***	-0.740***	-0.738***
	(0.202)	(0.187)	(0.189)	(0.189)	(0.188)	(0.190)	(0.156)	(0.191)
FinDev	0.0151	-0.00428	-0.00902	-0.00888	-0.00561	-0.00651	0.0288***	0.0116
	(0.0113)	(0.0107)	(0.0109)	(0.0110)	(0.0109)	(0.0109)	(0.00944)	(0.0110)
Openness	0.0296	0.00523	-0.00214	-0.00172	-0.0201	-0.0188	0.0476**	0.000159
	(0.0313)	(0.0290)	(0.0293)	(0.0295)	(0.0298)	(0.0297)	(0.0240)	(0.0282)
HumanCapital	-0.0195	0.0215	0.0340	0.0336	0.0471	0.0273	-0.0170	0.0155
	(0.0503)	(0.0467)	(0.0480)	(0.0482)	(0.0478)	(0.0487)	(0.0427)	(0.0467)
Inlfation	-0.00891***	-0.00678***	-0.00640***	-0.00637***	-0.00609***	-0.00627***		
	(0.00226)	(0.00211)	(0.00211)	(0.00213)	(0.00211)	(0.00210)		
Inlfation2							-0.00008***	-0.00007***
							(0.00002)	(0.00002)
Urban	0.0428	-0.0656	0.0262	0.0276	-0.0624	-0.0879		-0.0388
	(0.272)	(0.252)	(0.254)	(0.255)	(0.254)	(0.253)		(0.239)
Capital		0.720***	0.704***	0.702***	0.558***	0.533***		0.432***
		(0.0931)	(0.0940)	(0.0948)	(0.106)	(0.106)		(0.103)
FDI			0.334***	0.334***	0.424***	0.410***		0.358***
			(0.120)	(0.120)	(0.122)	(0.122)		(0.116)
Deathrate				-0.0585	0.215	0.302		0.680
				(0.439)	(0.444)	(0.444)		(0.453)
HHconsumption					-0.302***	-0.294***		-0.157
					(0.103)	(0.103)		(0.107)
Age						-0.509*		-0.403
						(0.262)		(0.249)
Constant	1.978***	1.775***	1.731***	1.743***	2.057***	2.362***	2.247***	2.266***
	(0.278)	(0.258)	(0.259)	(0.273)	(0.290)	(0.329)	(0.232)	(0.315)
Observations	451	451	444	444	444	444	566	432
R-squared	0.911	0.925	0.926	0.926	0.928	0.928	0.924	0.937
No. of Countries	76	76	76	76	76	76	98	74
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
*Income Group * Year*	YES	YES	YES	YES	YES	YES	YES	YES

Notes: This table provides the robustness tests by adding additional control variables. The dependent variable *lnGDPpc* is the logarithm of real GDP per capita. The independent variable *FinStr* is measured as the ratio bank credit to market capitalization. See Table 1 for definitions of all other control variables. Heteroskedasticity-consistent standard errors are reported in parentheses. We control for country, year and income-year effects in all specifications. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Appendix 1: Structure of the unbalanced panel used in estimation

Agg_Order	*Period*	*Observations*	*Percent*	*Cumulative*
1	1990-1992	56	7.98	7.98
2	1993-1995	74	10.54	18.52
3	1996-1998	91	12.96	31.48
4	1999-2001	93	13.25	44.73
5	2002-2004	102	14.53	59.26
6	2005-2007	103	14.67	73.93
7	2008-2010	99	14.10	88.03
8	2011-2013	84	11.97	100.00
Total		702	100.00	

Appendix 2: Estimate of optimal Financial Structure

VARIABLES	(1) *FinStr*	(2) *FinStr*
lnGDPpc	-1.266***	-1.266***
	(0.348)	(0.346)
legor_uk	-3.756***	-3.585***
	(1.101)	(1.097)
legor_fr	-1.115	-1.006
	(1.083)	(1.081)
legor_sc	-4.324**	-4.130**
	(1.700)	(1.698)
dis_eq	3.000	3.100
	(3.092)	(3.082)
natural	-3.470**	-3.601**
	(1.530)	(1.517)
popsize	-0.471*	-0.406
	(0.250)	(0.248)
popdensity	-0.893**	-0.941**
	(0.370)	(0.369)
distc[#]	-0.00199	-0.00224*
	(0.00128)	(0.00127)
Constant	29.02***	27.24***
	(5.157)	(4.872)
Observations	570	570
R-squared	0.091	0.077
Country FE	YES	NO
Year FE	YES	NO

Notes: This table provides the estimates of the optimal financial structure following Rajan and Zingales (1998) and Demirguc-Kunt et al. (2011). The dependent variable *FinStr* is measured as the ratio bank credit to market capitalization. *Distc_eq* is the average distance to the equator. Other variables are defined in Table 1.